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DEVELOPMENT AND TRANSFER OF TECHNOLOGY

WAYS AND MEANS OF LIMITING EMISSIONS OF HYDROFLUOROCARBONS AND PERFLUOROCARBONS

Note by the secretariat

CONTENTS

		Paragraphs	Page
I.	INTRODUCTION	1 - 6	3
A.	Mandate	1 - 2	3
B.	Scope of the note	3 - 5	3
C.	Possible action by the SBSTA	6	4
II.	BACKGROUND	7 - 9	4
III.	SUBMISSIONS	10 - 25	6
A.	General overview	10 - 13	5
B.	Refrigeration	14 - 16	7
C.	Foams	17	7
D.	Fire extinguishers	18	7
E.	Aerosols	19	7
F.	Solvents	20	8

		Paragraphs	Page
G.	Production of halocarbons and SF_6	21	8
H.	Metal production	22	8
I.	Semiconductor manufacturing	23	8
J.	Electrical insulation	24	8
K.	Other uses	25	8
IV.	REPORT ON THE JOINT IPCC/TEAP EXPERT MEETING ON OPTIONS FOR THE LIMITATION OF EMISSIONS OF HFCS AND PFCS	26 - 43	9

Annexes

I.	Structure of the form for submitting information	14
II.	List of Parties, intergovernmental and non-governmental organizations that submitted information	16

I. INTRODUCTION

A. Mandate

1. By its decision 13/CP.4, entitled "Relationship between efforts to protect the stratospheric ozone layer and efforts to safeguard the global climate system: issues related to hydrofluorocarbons and perfluorocarbons", the Conference of the Parties (COP) invited Parties, the relevant bodies of the Montreal Protocol, the Intergovernmental Panel on Climate Change (IPCC), intergovernmental organizations and non-governmental organizations to provide information to the secretariat, by 15 July 1999, on available and potential ways and means of limiting emissions of hydrofluorocarbons and perfluorocarbons, including their use as replacements for ozone-depleting substances. In addition, the COP encouraged the convening of a workshop by the IPCC and the Technology and Economic Assessment Panel of the Montreal Protocol (TEAP) in 1999 on the issue. It requested the secretariat to compile the information provided, including, if available, the conclusions of the workshop, for consideration by the Subsidiary Body for Scientific and Technological Advice (SBSTA) at its eleventh session. Furthermore, it requested the SBSTA to report on this information to the COP, at its fifth session, and to seek further guidance from the Conference of the Parties on this matter at that session (FCCC/CP/1998/16/Add.1).

2. The SBSTA, at its tenth session, took note of the information provided by the secretariat on how Parties, international organizations and other organizations may submit information electronically to the secretariat. It encouraged Parties, international organizations and other organizations to make use of the secretariat's web site as a means of providing information on ways and means of limiting emissions of HFCs and PFCs and requested the secretariat to make the information submitted also available on the web site (FCCC/SBSTA/1999/6, para. 70 (c)).

B. Scope of the note

3. This note has been prepared to respond to the above mandate. It contains background information on the issue and an overview of the submissions received from Parties, intergovernmental and non-governmental organizations. It also provides a short summary of the "Joint IPCC/TEAP expert meeting on options for the limitation of emissions of HFCs and PFCs".

4. Submissions from Parties and intergovernmental organizations are provided in document FCCC/SBSTA/1999/MISC.6. The full text of all submissions by Parties, intergovernmental and non-governmental organizations is available on the web site of the UNFCCC secretariat (http://www.unfccc.de/program/wam/). Computer diskettes with all submissions will be available for Parties at the session. A list of all organizations that submitted information is included in annex II.

5. This note contains only an overview of the information submitted to the secretariat. Parties are encouraged to consider the individual submissions from each organization.

C. Possible action by the SBSTA

6. The SBSTA may wish to consider the information provided in this document with a view to determining whether and if so, what future activities relating to the relationship between efforts to protect the stratospheric ozone layer and efforts to safeguard the global climate are necessary. In doing so, it may wish to bear in mind the activities under way in other intergovernmental organizations. It may also wish to consider whether Parties and other organizations should be further encouraged to submit information on ways and means of limiting emissions of HFCs and PFCs. The SBSTA may wish to provide guidance to the secretariat on these matters, including whether it should maintain a database on ways and means of limiting emissions of HFCs and PFCs.

II. BACKGROUND

7. To assist Parties and other organizations to respond to decision 13/CP.4, the secretariat facilitated the submission of information through its web site. An on-line form has been designed for use in submitting information electronically in a common structure and to facilitate the compilation and access to the information. The structure of the form is included in annex I.

8. Sulfur hexafluoride (SF_6) is neither explicitly included in decision 13/CP.4 nor used as a replacement for ozone-depleting substances. However, the secretariat's form provides an opportunity to also provide information on this gas, since HFCs, PFCs and SF_6 are often treated as a group, and in some cases technologies apply to HFCs or PFCs as well as to SF_6. The joint IPCC/TEAP workshop proceeded in the same way.

9. Box 1 provides an overview of fluorinated gases, their ozone depleting potential (ODP) and global warming potential (GWP) as well as their control in international agreements.

Box 1. Fluorinated gases and their control in international agreements

Group of gases	ODP	Net GWP	International control
CFCs	0.6 to 1	540 to 7100	Montreal Protocol: Industrialized countries phased out in 1996[a] Developing countries phase out by 2010[b]
HCFCs	0.001 to 0.52	20 to 1700	Montreal Protocol: Industrialized countries phase out by 2030[c] Developing countries phase out by 2040[c]
Halons	3 to 10	-85400 to -14100	Montreal Protocol: Industrialized countries phased out in 1994[a] Developing countries phase out by 2010[b]
HFCs	0	140 to 11700	Kyoto Protocol: Included in the group of gases, emissions of which industrialized countries have to limit or reduce in 2008-2012
PFCs	0	6500 to 9200	Kyoto Protocol: Included in the group of gases, emissions of which industrialized countries have to limit or reduce in 2008-2012
SF_6	0	23900	Kyoto Protocol: Included in the group of gases, emissions of which industrialized countries have to limit or reduce in 2008-2012
NF_3	0	10800	Not controlled

[a] With possible exemptions for essential uses; 15 per cent of base level production (1986/89 dependent on gas) allowed to be produced additionally to meet the basic domestic needs of developing countries. Applicable to production and consumption.

[b] With possible exemptions for essential uses; 15 per cent of base level production (average 1995 to 1997) allowed to be produced additionally to meet the basic domestic needs of developing countries. Applicable to production and consumption

[c] Applicable only to consumption.

Explanatory notes:

The chlorine and/or bromine contained in halocarbons (e.g. CFCs, HCFCs and halons) cause ozone depletion. HFCs, PFCs and SF_6 do not contain chlorine or bromine, they do not cause ozone depletion and hence their ozone depleting potential (ODP) is zero. ODP values are taken from the "UNEP handbook on international treaties for the protection of the ozone layer", Fourth Edition, 1996. Parties may wish to consult this reference for complete information on the Vienna Convention and the Montreal Protocol.

In accordance with decision 2/CP.3, the GWPs shown here (except for NF_3) are those provided by the IPCC Second Assessment Report ("1995 IPCC GWP values") based on the effects of the greenhouse gases over a 100-year time horizon. It may be noted that updated and slightly lower GWP values for CFCs, HCFCs and Halons are given in the "Scientific Assessment of Ozone depletion: 1998", WMO, Global Ozone Research and Monitoring Project - Report No. 44.

GWP values for ozone depleting substances (ODS) generally include two effects. Most ODS act directly as greenhouse gases, causing warming, and at the same time deplete ozone, itself a greenhouse gas, inducing indirect cooling. The indirect effects depend upon the abundance of other ozone depleting

/...

(continued)
substances and cannot be specified independent of past abundances and future scenarios. Net GWPs of CFCs, HCFCs and Halons, taking into account the direct and indirect effects, are provided by the IPCC Second Assessment Report as a range of values for some selected gases for the time frame 1990 to 2090. Values shown here are the lower and upper limits of these ranges. Halons have significantly negative GWPs and induce net cooling due to the negative forcing arising from ozone depletion. Regarding the uncertainty of the given GWPs for ozone depleting substances, the IPCC Second Assessment Report states that the "numbers presented ... should be considered illustrative of the relative values of GWPs among ozone depleting gases, but their absolute magnitudes are presently subject to considerable qualitative uncertainties (at least ±50%)."

The gas NF_3 has been included since its use has been reported in submissions. Its GWP is not given in the IPCC Second Assessment Report. The reference for the GWP of NF_3 is the Scientific Assessment of Ozone Depletion: 1998.

III. SUBMISSIONS

A. General overview

10. As at 18 August 1999, 26 submissions were received, 24 of them electronically. The submissions were from seven Parties (Canada, Finland on behalf of the European Community and its member states, Kenya, New Zealand, Norway, Sudan and United States of America), one intergovernmental organization, 14 non-governmental business organizations, two non-governmental environmental organizations, one organization from academia as well as one submission supported by a group of 30 organizations and individual experts from many different constituencies. A list of all organizations and titles of their submissions is included in annex II.

11. Fourteen submissions used the form provided by the secretariat. Some submissions included additional supplementary information, such as previously prepared studies. The submissions included 45 individual ways and means of limiting emissions. The total amount of information submitted is about 300 pages, excluding hard copies of sixteen publications, one video and one database.

12. The IPCC is currently preparing information on HFCs and PFCs in several reports. In the Third Assessment Report (TAR), due early 2001, Working Group I will include these gases in the analysis of global radiative forcing. Working Group III will include information on HFCs and PFCs in Chapter 2 (Mitigation Scenarios), Chapter 3 (Options to Mitigate Emissions), Chapter 5 (Barriers) and Chapter 6 (Policies and Measures). Some information on options to mitigate emissions will be provided in an Appendix. In addition, the IPCC special report on emission scenarios (SRES), due in March 2000, includes long term projections of HFC / PFC emissions.

13. The Technology and Economic Advisory Panel of the Montreal Protocol (TEAP) has formed an HFC/PFC task force which will provide a report on the implications to the Montreal Protocol of the inclusion of HFCs and PFCs in the Kyoto Protocol, to the eleventh Meeting of the Parties to the Montreal Protocol in Beijing, from 29 November to 3 December 1999. The

TEAP task force has submitted a bibliography, a list of relevant web sites, hard copies of 16 publications and a database on refrigerant literature.

B. Refrigeration

14. HFCs and PFCs are used as refrigerants in refrigerators and air conditioners, replacing CFCs and HCFCs. The largest number of submissions, 23 of the 45 individual ways and means, were relevant to refrigeration. It may be noted that different views were expressed regarding this category.

15. *Policies and measures.* Parties reported measures in place such as prohibiting venting of refrigerants, mandatory recovery and recycling / destruction of refrigerant, limiting the use of certain substitutes for ozone-depleting substances, registration of companies before refrigerants can be purchased or equipment serviced, regular mandatory leakage tests, eco-labelling and research. Industry reported on voluntary agreements between industry and governments, a register of refrigerant handlers, a code of practice for the minimisation of refrigerant emissions and a registered technicians programme.

16. *Technological options.* Four submissions contained a full review of the refrigeration and air-conditioning sector, seven submissions described different options to limit emissions, two submissions listed examples of application of alternative technologies and three provided information on one specific refrigeration technology. Some submissions focussed on limitation of refrigerant emissions while others included energy efficiency.

C. Foams

17. HFCs are used as foam blowing agents, replacing CFCs and HCFCs. Apart from general studies on HFCs, PFCs and SF_6, one Party reported on measures such as eco-labelling and voluntary agreements as well as technological options to reduce emissions.

D. Fire extinguishers

18. HFCs and PFCs are used as fire extinguishing gases, replacing halons. Parties reported measures in place to limit the use of certain substitutes for ozone-depleting substances, a ban of HFCs and PFCs in fire extinguishers, regular mandatory leak tests, annual mandatory reporting to regional authorities and voluntary agreements. One Party commented on technological options and an industry association representing the European fire industry provided a submission.

E. Aerosols

19. HFCs are used as propellants in aerosols, replacing CFCs and HCFCs. One Party reported technological options. An industry association, representing pharmaceutical companies, provided a submission on metred dose inhalers (MDIs).

F. Solvents

20. HFCs and PFCs are used as solvents, replacing CFCs and HCFCs. Parties reported measures in place to limit the use of certain substitutes for ozone-depleting substances and a ban of HFCs as solvents.

G. Production of halocarbons and SF_6

21. Emissions of HFCs, PFCs and SF_6 from chemical production can occur through inadvertent by-production or fugitive emissions. Parties reported measures in place such as pollution control statutes and technological options to reduce the emissions. One company described a capture and recycling system.

H. Metal production

22. PFCs are an inadvertent by-product of primary aluminium smelting, SF_6 is used in magnesium production and processing as an inert cover gas to prevent molten magnesium from re-oxidising. Parties reported measures in place such as pollution control statutes and voluntary agreements. An association of aluminium producers submitted the results of measures taken by its member companies. A company described a capture and recycling system.

I. Semiconductor manufacturing

23. HFCs, PFCs, SF_6 and NF_3 are used by the semiconductor manufacturers in plasma etching and chemical vapour deposition processes. Parties reported measures in place such as voluntary agreements. A global association of semiconductor manufacturers reported on its activities. A company described a capture and recycling system.

J. Electrical insulation

24. SF_6 is used in circuit breakers, gas-insulated substations, and switchgear as insulating gas. Parties reported measures in place such as voluntary agreements. Industry described a capture and recycling system, a reuse concept and a life-cycle assessment.

H. Other uses

25. Miscellaneous applications of HFCs, PFCs and SF_6 include their use in thermal and acoustic insulation, in inflatable products, as cosmetics, as cooling and heating fluid, in medical appliances, as testers and tracers and in nuclear fuel processing. Parties reported on ongoing efforts to reduce SF_6 in sound absorbing windows.

IV. REPORT ON THE JOINT IPCC/TEAP EXPERT MEETING ON OPTIONS FOR THE LIMITATION OF EMISSIONS OF HFCS AND PFCS

26. As invited by the COP (decision 13/CP.4) and subsequently by the Conference of the Parties to the Montreal Protocol (decision X/16, UNEP/OzL.Pro.10/9), the IPCC and TEAP organized a joint workshop on ways and means of limiting emissions of HFCs and PFCs.

27. Two documents emerged from that workshop, the first of which contains a summary of the results of the workshop. This document will be made available by the IPCC and TEAP at the eleventh session of the SBSTA. The second document is a compilation of the papers presented at the workshop and is available upon request from the IPCC and TEAP.

28. The following paragraphs 29 to 43 were provided by IPCC and TEAP as part of the workshop report and are reproduced here without formal editing by the UNFCCC secretariat.

29. *The IPCC/TEAP Joint Expert Meeting was the first opportunity for representatives of governments, international agencies, environmental organisations and the private sector to meet and explore co-ordinated actions that might be taken to address the atmospheric problems of stratospheric ozone depletion and climate change. It also provided the first opportunity for experts working on the climate problem through IPCC and those working on ozone depletion through TEAP to discuss their common and separate issues in the same forum. The meeting was held in Petten, the Netherlands, 26-28 May 1999, and was attended by over 100 participants from 24 nations.*

30. *Within the framework of the Montreal Protocol it has been recognised that substitutes for ozone depleting substances (ODSs) should be compatible with the goals of climate protection. Technical assessments have also utilised measures such as the Total Equivalent Warming Impact (TEWI) factor to study the implications for global warming of energy associated CO_2 emissions. However, the actual implementation of the Montreal Protocol cannot mandate climate change considerations since it only controls listed substances directly involved in ozone depletion. The Kyoto Protocol has created a more immediate need to further examine the relationship between the climate and ozone treaty regimes. It includes the hydrofluorocarbons (HFCs) among the gases that are to be controlled for climate protection, and these are the principal substances chosen as substitutes for ODSs under the Montreal Protocol.*

31. *The widely different replacement strategies for ODSs among countries demonstrate the need for more explicit international co-ordination of actions taken to address ozone depletion and climate protection simultaneously. The future choices of ODS substitutes are important for maintaining environmental quality and a sound economy, encouraging technological innovation, and for assuring developing countries an improved quality of life. These concerns formed the background, as well as a very important part for all discussions at the Joint Expert Meeting. Furthermore, the Meeting also provided an opportunity for specialists to examine the implications for both the global environment and the global economy of the Kyoto greenhouse gases which contribute to global warming, but which do not affect the ozone layer directly, such as CO_2, SF_6, and the perfluorocarbons (PFCs).*

32. The Joint Expert Meeting consisted of a one day plenary followed by working sessions organised by end-use application. The sectors projected to consume the largest amount of HFCs, are the refrigeration, mobile and stationary air conditioning industry, followed by insulating foam manufacturing, solvent and fire extinguishants, aerosol applications and medical devices. Use of PFCs and SF_6 is more specifically confined to narrowly defined sub-sectors such as chemical and metals manufacturing, electronics and specialty products. At the Meeting, each working group identified numerous technical options and management techniques for limiting emissions from specific applications. Particularly for HFC substitutes for CFCs, the working groups developed unprioritised lists of available and emerging options.

33. The experts concluded that while alternatives may not yet be technically and economically feasible for some current uses, there are technologies for other uses that can further reduce of ODSs and global warming gases in the near future. Plenary presentations also made clear that different governments were pursuing alternative strategies for replacing CFCs, especially in the refrigeration and air conditioning sectors. While several European governments such as Denmark and Sweden are considering regulations to limit the use of HFCs and are encouraging hydrocarbon and ammonia refrigerants, the United States is encouraging the use of HFCs together with containment and recycling. Japan is following a focused strategy to encourage low GWP substitutes for specific applications, while developing countries and countries with economies in transition are choosing various alternatives for CFCs depending upon commercial ties and their own industrial capacities.

34. The expert groups identified four distinct categories of options to reduce the emissions of HFCs, PFCs and SF_6:

*(a) **Alternative Substances and Technologies**. When available, alternatives eliminate the specified gas emissions entirely. A few participants in the Joint Expert Meeting believed that such alternative substances are available and that these should be explored as the primary option. However, most of the participants cautioned that the reduction of direct global warming from the elimination of a gas might be outweighed by increased indirect global warming from carbon dioxide if energy efficiency is lowered.*

*(b) **Containment.** Though there has been substantial technical progress in the containment and recycling of HFCs and PFCs as refrigerants, blowing agents or fire extinguishants, these procedures have not been applied to all markets; further improvements are expected to be feasible. In some cases, containment is driven by national regulations, but several voluntary industry initiatives have also been significant. While improved containment can substantially reduce releases, it cannot be 100% effective in practice.*

*(c) **Improved System or Process Design.** Altering the process or system design can substantially reduce emissions as has occurred with PFC releases in aluminium smelting and from electronics manufacturing; it has substantially reduced emissions of HFCs and N_2O associated with chemical manufacturing. Redesign of products can also permit the use of reduced chemical charge or use.*

(d) ***End of Product Life Recovery f***

recycling HFC refrigerants is fully commercial regulation (e.g., USA), or when voluntary indu place (e.g. Australia, Japan and France). Rec although destruction facilities exist in several have technical potential for major reductions i not be cost effective. The procedures for prom

35. For process related releases of HFCs a aluminium smelting, recovery of inadvertent by second instance, optimising the chemical and s production processes will minimise the generat substantially reducing these incidental releases these practices can be disseminated to all manu end-of-the-pipe capture with disposal or recycli

36. At the Joint Expert Meeting, the relation emissions and energy efficiency gains or losses technologies, was discussed at great length. Th energy efficiency as the most important element refrigeration and air conditioning group was di efficiency. A small number of participants belie of the Joint Expert Meeting whereas the majorit be considered. Considering the full, life cycle g choices of gases, technologies and processes un help to meet both sets of treaty goals sooner and Meeting also noted that there is a need for stand technologies and countries.

37. One government representative explicitly reductions from the elimination of CFCs, there HFCs and PFCs by prohibiting their use, while buildings and appliances.

38. There was a strong plea to assist develop transition in simultaneously improving the energ assisting them in shifting away from CFCs in ref applications. While not required to eliminate CF already proceeded in the transition process away synergistic projects be financed jointly by the M Facility, and that a simple, dual-goal application project application system on the other hand wou

39. Developing countries expressed concern impose their own choice of technology on develo

trust and mutual respect under the Protocol and would be counterproductive if developing countries would begin to question the advice given within the Montreal Protocol framework. Specifically, concerns were expressed that uncertainty on possible controls to address climate change may adversely affect compliance with Montreal Protocol obligations particularly for the refrigeration, air conditioning and foams sector. This could undermine credibility of future global environmental treaties. It is also essential that technologies chosen to address climate change and ozone protection meet the sustainable development goals of developing countries.

40. Data presented at the Expert Meeting clearly demonstrated that consumption of CFCs and halons reached its peak in terms of their contribution to ozone depletion and global warming in the year 1988. In the ten years since, the actions taken under the Montreal Protocol have reduced the ODP weighted emissions of these substances and their HCFC substitutes by approximately 80% (with almost 18% due to continued CFC and halon consumption in some countries). These actions have also decreased the direct global warming impact of all the fluorocarbons by approximately two-thirds. The rate of reduction has, however, slowed between 1995 and 1997. Projecting into the future proved more difficult since it depends critically upon assumptions about technical feasibility of alternatives, and future demand for the services provided by these types of substances.

41. Several sector working-groups quantified the range of technically feasible emission reduction options available in the near term. More detailed analysis is still needed for the many sub-sectors of refrigeration, air conditioning and heat pumps. More information is also needed to derive global estimates of future emissions of HFCs under different system tightness and replacement scenarios, and alternative assumptions concerning different emission projections, life cycle analysis, cost performance ratios etc. In addition, more work is needed to quantify carbon dioxide emissions reductions that could be achieved at various costs through energy efficiency improvements in the refrigeration, air conditioning and heat pump sector and in building related insulation foam. Even for the EU where data is the most detailed, scenarios differed by more than a factor of two (1.7% to 4% of CO2 equivalents) for the level of HFC use in the EU by 2010. Substantial increases in HFC use are anticipated in the refrigeration and air conditioning, insulating foam, medical and aerosol sectors, while major reductions will occur from lowered releases of HFCs in HCFC manufacturing.

42. While the precise HFC growth was uncertain, it appears that the use of HFCs will be substantially less in amount and in terms of contribution to global warming than the CFCs and HCFCs they replace. PFC use and release is expected to remain small because of its limited applicability, and also due to the high price of these chemicals. Because of the early stage of substitution and numerous uncertainties regarding the development of HFC end user markets, it was concluded that an accurate emission forecast for the first Kyoto Commitment Period (i.e., 2008-2012) is virtually impossible to make at this time.

43. Presentations and discussions at the Joint Expert Meeting highlighted the complexity of the links between ozone depletion and climate change mitigation activities, the multiplicity of solutions required to address these two global change issues simultaneously, and the need for solutions tailored to regional or national needs. The different perspectives of the experts on the

possible future emissions and current and future availability and feasibility of alternatives to HFCs, PFCs and SF6 in each sector demonstrates the need for substantial additional research and analysis to provide a valid and consistent, qualitative and quantitative picture of potential options. Despite uncertainty and differing opinions expressed at the Joint Expert Meeting, many practical options for reducing emissions of these gases were identified.

Annex I

STRUCTURE OF THE FORM FOR SUBMITTING INFORMATION ON HFCS, PFCS AND SF_6

Organization:
[ ]Party's submission
[ ]United Nations
[ ]Intergovernmental organization
[ ]Non-governmental organization

Contact person: Ms./Mr.
First name:
Last name:
Street (1):
Street (2):
Postal code:
City:
State:
Country:
Telephone:
Fax:
E-mail:
WWW:
Date of submission: dd/mm/yyyy

Title:
Type (select from below):
Category (select from below):
Gases affected (select from below):
General description:
Impacts on ozone depletion:
Impacts on global warming:
Other environmental impacts:
Economic impact (cost):
Timing issues:
Examples of application:
Regional availability or applicability:
Other remarks:
Sources of additional information (what and where):
Link to more information:

Types:
Technology, leakage reduction in existing equipment
Technology, recovery / recycling
Technology, destruction
Technology, improved system design
Technology, substitution of gas in existing equipment
Technology, substitution of gas and equipment
Technology, other
Policy and measure, regulation
Policy and measure, tax
Policy and measure, government subsidy
Policy and measure, voluntary agreement
Policy and measure, public education
Policy and measure, specialist training
Policy and measure, other

Categories:
Aluminium production
Magnesium production
Feedstock
By-product emissions
Fugitive emissions
Refrigeration, domestic
Refrigeration, commercial
Refrigeration, cold storage and food processing
Refrigeration, industrial
Refrigeration, air conditioning and heat pumps (air cooled systems)
Refrigeration, air conditioning (water chillers)
Refrigeration, transport
Refrigeration, mobile air conditioning
Refrigeration, heat pumps (heating only and heat recovery)
Refrigeration, other
Foam, polyurethane, rigid, domestic refrigerators and freezers
Foam, polyurethane, rigid, other appliances
Foam, polyurethane, rigid, boardstock/flexible faced lamination
Foam, polyurethane, rigid, sandwich panels
Foam, polyurethane, rigid, spray
Foam, polyurethane, rigid, slabstock
Foam, polyurethane, rigid, pipe
Foam, polyurethane, rigid, one component
Foam, polyurethane, flexible, slabstock and boxfoam
Foam, polyurethane, moulded
Foam, polyurethane, integral skin
Foam, polyurethane, miscellaneous
Foam, phenolic
Foam, extruded polystyrene, sheet
Foam, extruded polystyrene, boardstock
Foam, extruded polystyrene, polyolefin
Foam, other
Fire extinguishers, fixed systems
Fire extinguishers, portable extinguishers
Aerosols, metred dose inhalers

Categories (*continued*)

Aerosols, personal care
Aerosols, household
Aerosols, industrial
Aerosols, other
Solvents, precision cleaning
Solvents, electronics cleaning
Solvents, metal cleaning
Solvents, deposition applications
Solvents, other
Semiconductors manufacturing
Electrical insulation
Thermal / acoustic insulation
Inflatable products
Cosmetics
Cooling and heat transfer fluid
Medical
Testing and tracers
Nuclear
Other

Gases:
HFC-23
HFC-32
HFC-41
HFC-125
HFC-134
HFC-134a
HFC-152a
HFC-143
HFC-143a
HFC-227ea
HFC-236fa
HFC-245ca
HFC-43-10mee
Other HFCs
CF_4
C_2F_6
C_3F_8
C_4F_{10}
c-C_4F_8
C_5F_{12}
C_6F_{14}
Other PFCs
SF_6

Annex II

LIST OF PARTIES, INTERGOVERNMENTAL AND NON-GOVERNMENTAL ORGANIZATIONS THAT SUBMITTED INFORMATION[1]

Parties	Titles of submission
Canada	Ways and means of limiting emissions of HFCs and PFCs
Finland on behalf of the European Community and its member States	Available and potential ways and means of limiting HFC, PFC and SF6 emissions
	Refrigerant conservation
	Refrigerant alternatives
	Refrigerant charge size reduction
	Alternative refrigeration technologies
	Refrigerant recovery and disposal
	Alternative foam blowing agents
	Not-in-kind insulation materials
	Emissions reduction options for HFC-blown foams
	Reduction of HFC emissions from aerosols
	Reduction of HFC emissions from solvents
	Reduction of HFC and PFC emissions from fire fighting
	Reducing HFC-23 emissions from manufacturing of HCFC-22
	Reducing PFC emissions from primary aluminium smelting
	Reducing PFC, HFC and SF6 emissions from semiconductors manufacturing
Kenya	Potential ways and means of limiting emissions of hydrofluorocarbons and perfluorocarbons
New Zealand	Relationship between efforts to protect the stratospheric ozone layer and efforts to safeguard the global climate system: issues related to hydrfluorocarbons and perfluorocarbons
Norway	Ways and means to limit emissions of HFCs
Sudan	Available and potential ways and means of limiting emissions of HFCs and PFCs, including their use as replacements for ODSs
USA	Available and potential ways and means of limiting emissions of hydrofluorocarbons and perfluorocarbons
	Voluntary Aluminum Industrial Partnership (VAIP)
	SF6 Emissions Reduction Partnership for Electric Power Systems
	SF6 Emission Reduction Partnership for the Magnesium Industry

[1] As at 18 August 1999

	U.S. Voluntary PFC Emission Reduction Partnership for Semiconductors
	HFC-23 Emission Reduction From HCFC-22 Manufacture
	U.S. Environmental Protection Agency, Clean Air Act, Title VI, sections 608 and 609 Recycling and Emissions Reductions Programs
	U.S. Environmental Protection Agency, Clean Air Act Title VI, section 612 Significant New Alternatives Policy (SNAP) program

Intergovernmental organizations	**Titles of submission**
Technology and Economic Assessment Panel (TEAP)	Activities of the TEAP Task Force on HFCs and PFCs

Non-governmental organizations	**Titles of submission**
The Air Conditioning and Refrigeration Industry Board (ACRIB)	Declaration of intent on the use of HFCs
The Air Conditioning and Refrigeration Industry Board (ACRIB)	Register of Refrigerant Handlers
American Air Liquide	SF_6/PFC Capture and Recycling System
Association Francaise du Froid	Document submitted by Association Francaise du Froid
Calor Gas Ltd. Joint expert submission	Use of non-HFC technology
Climate Action Lanka	Refrigerant substitution
ECOFYS	Reduction of the emissions of HFC's, PFC's and SF_6 in the European Union
EUROFEU	The Need for Fluorocarbons in Fire Protection
Greenpeace	How to limit HFC emissions? Eliminate them.
Greenpeace	Cool Technologies: Working without HFCs, Video
ICI Klea	Reducing emissions from domestic appliances
ICI Klea	HFCs - Facts not Emotions
Institute of Refrigeration	Code of Practice for the Minimization of Refrigerant Emissions
International Institute for Applied Systems Analysis (IIASA)	A model for estimating future emissions of sulfur hexafluoride and perfluorocarbons
International Institute of Refrigeration	Reduction of emissions of HFCs. Various aspects to be taken into account
International Pharmaceutical Aerosol Consortium (IPAC)	Documents submitted by IPAC
International Primary Aluminium Institute	PFC Surveys form International Primary Aluminium Institute
Solvay Flour und Derivate	Life-cycle assessment 'Electricity supply using SF_6 technology'
Solvay Flour und Derivate	Primary and secondary recycling of fluorinated refrigerants
Solvay Flour und Derivate	SF_6 ReUse concept

Vehicle Air Conditioning Specialists Australia	Refrigerant recovery from written off vehicles
Vehicle Air Conditioning Specialists Australia	Registered Technicians Programme
Vehicool	Adiabatic Air Conditioning (AAC)
World Semiconductor Council	World Semiconductor Council Activities in Support of Limiting Emissions of HFC's, PFC's and SF_6

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UNITED NATIONS

Framework Convention on Climate Change

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8 October 1999

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SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE
Eleventh session
Bonn, 25 October - 5 November 1999
Item 11 (b) of the agenda

COOPERATION WITH RELEVANT INTERNATIONAL ORGANIZATIONS

UNITED NATIONS BODIES

Capacity-building support regarding the clean development mechanism

Note by the secretariat

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA), at its tenth session, welcomed the initiative of the secretariat to bring together four United Nations bodies, the United Nations Conference on Trade and Development, the United Nations Development Programme, the United Nations Environment Programme and the United Nations Industrial Development Organization, and encouraged it to continue drawing upon their contributions for the development of a joint project on capacity-building for developing countries for the clean development mechanism, taking careful account of relevant decisions and conclusions of the Conference of the Parties and its subsidiary bodies. It also requested the secretariat to make further information available for consideration at its eleventh session.

2. In response to this request, the secretariat and its partners in this project will make available to Parties a revised project proposal. This proposal will take into account the views on capacity-building expressed by the Group of 77 and China (see FCCC/SB/1999/MISC.9) and by other Parties (see FCCC/SB/1999/MISC.11), as well as comments made in the revised plan for facilitating capacity-building related to the mechanisms (see FCCC/SB/1999/6).

3. Given the tight deadlines for those inputs and their processing, it was not possible to prepare the revised project proposal in time for pre-session submission. It will, however, be made available as document FCCC/SBSTA/1999/INF.8/Add.1 during the fifth session of the Conference of the Parties.

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Framework Convention on Climate Change

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25 October 1999

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COOPERATION WITH RELEVANT INTERNATIONAL ORGANIZATIONS

UNITED NATIONS BODIES

Capacity-building support regarding the clean development mechanism

Note by the secretariat

Addendum

1. As foreseen in document FCCC/SBSTA/1999/INF.8, the secretariat and its partners in the development of a joint project on capacity-building for developing countries for the clean development mechanism have made available to Parties a revised draft project proposal. This proposal takes into account the views on capacity-building expressed by the Group of 77 and China (see FCCC/SB/1999/MISC.9) and by other Parties (see FCCC/SB/1999/MISC.11), as well as comments made in the revised plan for facilitating capacity-building related to the mechanisms (see FCCC/SB/1999/6).

2. The draft project proposal, which is annexed to this note, represents work in progress and is reproduced without formal editing by the Convention secretariat. Upon integration of comments received during the fifth session of the Conference of the Parties and the consequent finalization of the draft proposal, additional funding will be sought for the implementation of the project.

Ann

Capacity building support regarding

DRAFT Projec

(For Consultatio
Revisio
25 Octobe

Title of project	(Pilot Project) Capaci (Clean Development
Starting date	First Quarter 2000
Duration	2 years (2000-2001)
Location	Global, regional, sub-
Requesting agency	Secretariat of the Uni Climate Change (UNF
UN bodies involved	UNCTAD, UNDP, UN
National counterpart institutions	Relevant national auth
Cooperation with associated bodies and agencies	GEF, World Bank, Wo Development (WBCSI organizations, local go international financial a relevant bodies
Total project funding	US$ 4,930,000
Committed funding	US$ 1,500,000 from U
Funding sought	US$ 3,430,000

Brief Description/Summary

1. The purpose of the Clean Development M countries achieve sustainable developmen (industrialized countries) achieve complian Kyoto Protocol (KP) through the acquisitio from project activities. Such project activiti technological resources from the public an promote sustainable development in develo ultimate objective of the UNFCCC.

2. The modalities and procedures of the CDM set forth in the Buenos Aires Plan of Action decision at COP 6 in November 2000. In th provide guidance on capacity building for th implementing the Convention at COP 5, bas the "Revised Capacity Building Plan" which at the tenth sessions of the subsidiary bodie accepted a lead role in this pilot project to fa bodies and to ensure that this pilot project w on capacity building that may be adopted at secretariat is consistent with its mandate as Convention.

3. The CDM has the potential to become anoth sustainable development. The pilot project i

realize this potential while contributing to ongoing sustainable development efforts. In particular, the pilot project is aimed at contributing to this process of preparing for the possible implementation of the CDM in the following ways:

3.1. It will contribute to the assessment of the needs and priorities of developing countries and potential investors in the development of a capacity building plan for CDM, through initial pilot efforts at building capacity at the country level;

3.2. It will contribute knowledge and lessons learned gained from the experience with pilot, prototype CDM projects, and initial efforts at developing CDM methodological and analytical tools;

3.3. It will test out various modalities for the delivery of capacity building services, which respond to the guidance on capacity building that may be provided by the COP;

3.4. It will establish a collaborative mechanism under the overall leadership of the secretariat to facilitate coordination of capacity building activities provided to Parties by the participating UN bodies in line with the decision/s on capacity building that may be adopted by the COP.

4. The pilot project involves four sub-projects each led by one of the participating UN bodies in cooperation with some or all of the other participating bodies. Each of the sub-projects is treated as a distinct activity cluster with its own immediate objectives, outputs and, funding and implementation arrangements. However, the overall pilot project provides for the necessary collaborative institutional arrangements and delivery mechanisms to pull these various efforts together to meet the objectives set forth above.

5. The four sub-projects are linked and complementary to one another. Simple coordinating mechanisms will be put in place in the overall project and within each sub-project to ensure that the outputs of one sub-project can be deployed in other sub-projects and maximum impact is achieved.

Sub-project 1: Preparing for CDM: Awareness-raising, agenda setting, institution building and needs assessment in preparation for CDM (led by UNFCCC)

Sub-project 2: Developing CDM Tools: Development and testing of methodological and analytical tools likely to be used in CDM (led by UNEP)

Sub-project 3: Testing CDM Projects: Testing prototype CDM projects with private sector investors (led by UNDP)

Sub-project 4: Information Exchange, Communications and Lessons Learned Information exchange, communication of lessons learned to enhance the UNFCCC process, and project coordination (led by UNFCCC)

6. The pilot project will be directed by a steering group comprised of representatives of the participating UN bodies and representatives from civil society, under the overall leadership of the UNFCCC secretariat. Each of the sub-projects will have its own sub-project management team, which will receive guidance from the project steering group. The project manager of the overall pilot project will be an ex-officio member of each of the sub-project management teams.

7. The pilot project is expected to have a positive environmental impact, model the Revised Capacity Building Plan to be presented to COP5, and remain flexible to respond effectively to the modalities and procedures which the COP may decide upon to implement CDM. In addition, the pilot project will be guided by the following operational principles:

   7.1. Put priority on national implementation by national institutions and strengthen national and regional institutional arrangements conducive to the implementation of the UNFCCC, and eventually the CDM;

   7.2. Facilitate the participation of public and private sector entities;

   7.3. Enable capacity building support services to be provided by developing country-based expert institutions at sub-regional and regional levels;

   7.4. Mobilize national stakeholders to the opportunities and challenges presented by CDM, including options for its future development, and encourage the emergence and strengthening of appropriate national agendas and institutional arrangements;

   7.5. Enhance the participation of developing countries in the UNFCCC negotiations;

   7.6. Focus on preparing Parties to operationalize all of the basic elements of CDM.

8. The proposed pilot project is innovative in several ways. First, it deals with a new, untested international mechanism that is still under development. Second, it promotes partnerships between the public and private sectors and between the private sectors in Annex I and in non-Annex I countries. Finally, it seeks to establish a collaborative approach among UN bodies to facilitate a coordinated response to the decisions and guidance of the COP.

Background

1. The purpose of the Clean Development Mechanism (CDM) is to assist developing countries achieve sustainable development, and to assist Annex I Parties (industrialized countries) achieve compliance with their emission targets under the Kyoto Protocol (KP) through the acquisition of certified emission reductions accruing from project activities. Such project activities are expected to mobilize financial and technological resources from the public and private sectors in Annex I Parties to promote sustainable development in developing countries, and contribute to the ultimate objective of the UNFCCC.

2. The modalities and procedures of the CDM still need to be decided by the COP. As set forth in the Buenos Aires Plan of Action, the COP is expected to make this decision at COP 6 in November 2000. In the meantime, the COP is expected to provide guidance on capacity building for the mechanisms and other aspects of implementing the Convention at COP 5, based on a range of inputs by Parties and the "Revised Capacity Building Plan" which the secretariat was requested to prepare at the tenth sessions of the subsidiary bodies. In this context, the secretariat has accepted a lead role in this pilot project to facilitate the coordinated input of other UN bodies and to ensure that this pilot project will respond to the decisions of the COP on capacity building that may be adopted at COP 5. The envisaged role of the secretariat is consistent with its mandate as provided for in Article 8.2 (e) of the Convention.

3. An earlier version of this project proposal was submitted for funding to the United Nations Fund (UNF) through the United Nations Foundation for International Partnerships (UNFIP) on 15 April 1999. The UNF agreed to fund one component of the project proposal at 1.5 million US dollars. This component is the UNDP-led sub-project 3: *Testing CDM Projects* now mentioned in this pilot project proposal.

4. The original proposal was revised to be more responsive to the views of Parties expressed at the tenth session of the subsidiary bodies. Nonetheless, the present proposal is expected to be revised further to respond to the decisions on capacity building that the Parties may adopt at COP 5 prior to its submission to other donors.

Project objectives

5. The pilot project proposal is aimed at contributing to the process of preparing for the possible implementation of the CDM by focusing on the capacity needed by developing countries to participate effectively in the CDM. In addition to responding to the decisions on capacity building that the Parties may adopt at COP 5, the project, through pilot test CDM projects and nationally implemented activities, will contribute in the following ways:

   5.1. It will contribute to the assessment of the needs and priorities of developing countries and potential investors in the development of a capacity building plan for the KP mechanisms, in particular for CDM, through initial pilot efforts at building capacity at the national level;

   5.2. It will contribute knowledge and lessons learned gained from the experience with pilot, prototype CDM projects, and initial efforts at developing CDM methodological and analytical tools;

5.3. It will test out various modalities for the delivery of capacity building services, which respond to the guidance on capacity building to be provided by the COP;

5.4. It will establish a collaborative approach under the leadership of the secretariat to facilitate coordination of capacity building activities provided to Parties by the participating UN bodies in line with the Revised Capacity Building Plan to be adopted at COP 5.

Project portfolio

6. The pilot project involves four sub-projects each led by one of the participating UN bodies in cooperation with some or all of the other participating bodies. Each of the sub-projects is treated as a distinct activity cluster with its own immediate objectives, activities and outputs, budget, and implementation arrangements.

7. Sub-project 4, in particular, is designed to provide some of the collaborative approaches that will ensure coordination and cost-effectiveness among the sub-projects. Because the projects are linked and coordinated, they are presented as a portfolio of sub-projects.

8. The four sub-projects are linked and complementary to one another. They are designed to be modular and flexible enough to accommodate a staggered start-up and add-ons (addition of participants, activities) as resources become available.

Sub-project 1: Preparing for CDM: Awareness-raising, agenda setting, strategy development, institution building and needs assessment in preparation for CDM (led by UNFCCC)

Sub-project 2: Developing CDM Tools: Development and testing of methodological and analytical tools likely to be used in CDM (led by UNEP)

Sub-project 3: Testing CDM Projects: Testing prototype CDM projects with private sector investors (led by UNDP)

Sub-project 4: Information Exchange, Communications and Lessons Learned Information exchange, communication of lessons learned to enhance the UNFCCC process, and project coordination (led by UNFCCC)

9. Each of the sub-projects will be treated below and described briefly in terms of their immediate objectives, activities and outputs, budget, and implementation arrangements.

Sub-project 1: Preparing for CDM: Awareness-raising, agenda setting, needs assessment and institution building in preparation for CDM (led by UNFCCC)

10. The sub-project is a pilot activity aimed at developing replicable activities and processes for awareness-raising, agenda setting, needs assessment and institution building in preparation for CDM. Initially, it will test innovative ways of enabling developing countries to prepare the groundwork for the possible implementation of CDM by: (a) facilitating dialogue on CDM from a developing country point of view both nationally and regionally, (b) undertaking preliminary national studies on CDM as a mechanism for promoting sustainable development, and (c) assessing the capacity building needs through a clearer understanding of what capacities may be needed to implement CDM projects vis-à-vis existing capacities.

11. As part of its output, the sub-project will consciously explore activities, materials, processes and resources which can be replicated in the future for wider application. It will also focus on contributing to the development of a strategic response to capacity building based on experiences from the other sub-projects, by feeding its outputs into the COP and CDI processes, and the other sub-projects.

12. Immediate objectives

12.1. To raise the awareness of policy and decision makers on the possible challenges and opportunities presented by CDM and to foster continued dialogue at all levels.

12.2. To facilitate the development of national and regional agendas on CDM.

12.3. To encourage governments to consider national institutional arrangements such as national CDM teams, which can lead the identification, development and implementation of CDM projects as well as assess the national capacities required to successfully participate in the CDM.

12.4. To develop and test replicable regional delivery mechanisms for capacity building support services.

12.5. To contribute to the CDI assessment, strategy and action plan development particularly on the capacity building required for CDM.

13. Activities and outputs

Activities and costs	Outputs
Regional awareness-raising and agenda-setting workshops (US$ 50,000 per workshop)	• Regional exchange of views on challenges and opportunities for CDM • Initial case studies on challenges and opportunities for CDM conducted by expert institutions in developing countries • Regional agendas for promoting, developing and implementing CDM projects • Identification of project examples for use in analysis and needs identification • Identification and networking of regional experts and expert institutions • Survey of existing regional and national studies on CDM • Information and workshop materials, including materials on

	the CDM adaptation components, transfer of technology, economic and investment measures, and the financial aspects of CDM (building on UNIDO, UNCTAD and UNEP work)
National awareness-raising and agenda-setting workshops (organized by national teams) (US$ 15,000 per workshop)	• Start-up workshop for preparation of national studies on CDM implementation • National exchange of views on challenges and opportunities for CDM • Development of national agendas for promoting, developing and implementing CDM projects • Identification of possible CDM capacities required in developing countries • Information and workshop materials
National studies on CDM implementation (conducted by national teams) (US$ 50,000 per study)	• Establishment of ad hoc national CDM teams • National studies on challenges and opportunities for CDM and development of national strategy on CDM • Identification of legal, managerial, financial and institutional environment conducive to CDM and the corresponding capacities required as well as capacity building needs • Analysis of project examples
Follow-up national consultations to present outputs of previous activities (US$ 20,000 for 2 national consultations)	• Consultations on national studies, national CDM strategy and plan of action with policy and decision makers by national teams • Assessment of capacity building needs for CDM and proposal of specific capacity building strategy and projects • Consultations with sectoral groups like business and industry
Follow-up regional workshops (US$ 50,000 per workshop)	• Networking of national CDM teams • Exchange of national studies on CDM • Refinement of regional agendas and possible development of regional strategy on CDM • Development of regional capacity building mechanisms (arrangements for support to national CDM teams by regional expert institutions)
CDI Steering Committee Meetings (US$ 10,000)	• Contribute developing country experience to the formulation of a conceptual framework of capacity building • Contribute to assessment of capacity building needs
CDI Regional Meetings (U$ 10,000)	• Contribute specific experience to CDI assessment, particularly on CDM • Contribute national studies on CDM to CDI meeting

14. Implementation arrangements

15. The sub-project will be led by the UNFCCC secretariat and implemented in cooperation with UNEP, UNDP, UNIDO, UNCTAD and the GEF. A Project Management Team involving the cooperating bodies will be established where the secretariat will play a facilitating and coordinating role.

16. The activities of the sub-project particularly at the national level will be implemented and directed by developing country experts and institutions at the national and regional levels. Priority will be placed on identifying implementation arrangements,

which will allow for country-level support services to be provided by experts and expert institutions in developing countries at a sub-regional or regional basis.

17. The sub-project will be conducted in conjunction with sub-projects 2 and 3. It will be implemented in the same 9 countries (in 3 regions)[1] where the sub-projects 2 and 3 will be deployed. The regional workshops and national studies envisaged in the sub-project will be the same activities used in sub-project 2[2]. In all cases, the activities involved in this pilot will dovetail with the planned activities of Enabling Activities implemented by UNDP and UNEP, the GEF Country Dialogue Workshops (C [3], and the Capacity Development Initiative (CDI)[4] of the GEF and UNDP, and other related activities. Where possible, the workshops and activities involved will be implemented using the same resources or organized back-to-back to complement existing activities outside of this project, e.g. CDW, CDI.

18. The sub-project will be also linked closely to the CDI in the assessment of capacity building needs and the development of a capacity building strategy and action plan. Relevant outputs will be fed into the CDI and COP processes as needed.

19. Budget

20. The indicative budget below is calculated for 3 countries in 3 regions (Africa, Latin America and Asia).

Activity	Costs (US$)
Regional workshops (3 regions x $50,000)	150,000
National workshops (9 countries x $15,000)	135,000
National CDM studies (9 countries x $50,000)	450,000
National consultations (9 countries x $20,000)	180,000
Follow-up regional workshop (3 x $50,000)	150,000
Participation in the CDI Steering Committee	10,000
Participation in CDI Regional Meetings	10,000
Total	**1,085,000**

[1] See section on *Overall implementation strategy* for criteria on country selection, which will be developed by the Project Steering Group.

[2] See section on *Relationships between workshops and activities* on page 18.

[3] The GEF Country Dialogues Workshop is a US$3.5 million project of the GEF and its Implementing Agencies which will deliver about 50 national workshops "to build country coordination and capacity and promote country ownership and awareness-building by means of country level dialogue organized through targeted, participatory workshops".

[4] The Capacity Development Initiative is part of the Strategic Partnership between GEF and UNDP, which will launch "a consultative process for developing the initiative through extensive outreach and dialogue with countries and stakeholder institutions to identify countries' needs, lessons learned, and a strategy and action plan for the future". Initial funding for the CDI is proposed at US$1.5 million.

Sub-project 2: Developing CDM Tools: Development and testing of methodological and analytical tools likely to be used in CDM (led by UNEP)

21. The sub-project will focus on developing and testing methodologies and analytical tools likely to be used in CDM based on the initial experiences of developing countries (e.g. sector-related, economic and financial, technology transfer, certification, verification and monitoring, environmental and sustainability indicators, baseline approaches, project selection and screening, etc.). The sub-project will be implemented in the same 9 developing countries (in 3 regions) where sub-projects 1 and 3 will be deployed.

22. The activities of the sub-project will be implemented with the active participation of developing country experts to ensure that the tools developed are appropriate for application in developing countries and are responsive to developing country needs and priorities. The testing of the CDM methodologies and analytical tools will be conducted at the national level to capture differences in requirements and capacities in developing countries.

23. The sub-project will build on the ongoing, pilot work of UNEP and UNIDO in developing CDM methodologies and analytical tools for developing countries. The sub-project will closely follow the negotiations on the CDM modalities, and the lessons learned from the IPCC experience in developing and deploying technical guidelines for climate change studies.

24. Immediate objectives

24.1. To identify, develop and test methodologies and analytical tools which are relevant for the implementation of projects and adaptation activities under CDM at the national level.

24.2. To design these CDM methodologies and analytical tools in ways appropriate for the use and application of developing countries.

24.3. To disseminate these tools and develop a strategic plan for its continued development by and application in developing countries.

25. Activities and outputs

Activities and costs	Outputs
Expert meetings (with experts from developing countries) (US$ 75,000 per meeting)	• Identification of methodologies and analytical tools which are relevant for the implementation of CDM at the national level (e.g. sector-related, economic and financial, technology transfer, certification, verification and monitoring, environmental and sustainability indicators, baseline approaches, project selection and screening, etc.) • Survey and assessment of existing methodologies and analytical tools • Elaboration of relevant methodologies and tools • Initial guidelines on how to develop and disseminate tools in appropriate ways in developing countries
Regional consultative workshops	• Start-up workshop to define work plan for development of tools • Initial assessment and selection of tools to be developed

(US$ 50,000 per workshop)	• Initial guidelines on appropriate form and design of tools for use in developing countries
Regional collaboration in development of tools, including training and technical support (US$ 300,000)	• Regionally-specific methodologies and analytical tools developed with the active participation and input of developing country experts • Regionally adapted methodologies and analytical tools • Regional testing of tools in selected countries • Regional training of experts and expert institutions
Development of methodologies and tools for baselines and additionality quantification for CDM projects in industry (US$ 200,000)	• Industry-specific methodologies and analytical tools (including software) for baseline assessment in energy efficiency projects • Regional case studies assessing highly replicable mitigation options in energy-intensive sub-sectors
National testing of methodologies and tools, including training and technical support (US$ 50,000 per country)	• National application of CDM methodologies and analytical tools • National training of experts and expert institutions by regional experts and expert institutions • (Note: National testing of tools will involve the application of the tools in the preparation of national studies under sub-project 1)
Evaluation and further development, including re-training and further technical support (US$ 100,000)	• Assessment of tools based on national testing • Regional evaluation of tools • Improved CDM methodologies and analytical tools • Regional re-training of experts and expert institutions
Deployment of CDM methodologies and analytical tools (US$ 100,000)	• Development of plan for the continued development of methodologies and tools and, deployment and application in developing countries • Publication and deployment of methodologies and tools through various media (e.g. Internet, CD-ROMs, transfer to national and regional centers of excellence, etc.)

26. Implementation arrangements

27. The sub-project will be led by UNEP and implemented in cooperation with UNIDO and UNCTAD. Specific tasks will be sub-contracted to UNIDO and UNCTAD. The sub-project will be linked closely to the other sub-projects (particularly sub-projects 1 and 3: *Preparing for CDM and Testing CDM Projects*).

28. The sub-project will be implemented in the same countries where sub-projects 1 and 3 will be deployed. Outputs developed will be shared and used in the other sub-projects and communicated to the UNFCCC process. In so far as capacity building needs are identified, these will also be channeled to the other sub-projects, the UNFCCC process, and the GEF Capacity Development Initiative.

29. Budget

Activity	Costs (US$)
Expert meeting (2 meetings x $75,000)	150,000
Regional consultative workshops (3 regions x $50,000)	150,000
Regional development of CDM tools	300,000
Baseline and Additionality Quantification Tools for Industry	200,000
National testing (9 countries x $50,000)	450,000
Regional evaluation of CDM tools	100,000
Deployment of CDM tools and linkage with UNIDO-led component	100,000
Total	**1,450,000**

Sub-project 3: Testing CDM Projects: Testing prototype CDM projects with private sector investors (led by UNDP, funded by UNF)

30. The sub-project will be led by UNDP in partnership with the World Business Council for Sustainable Development (WBCSD). It will focus largely on encouraging potential private sector investors to invest in prototype CDM projects as a "practical CDM laboratory" which can generate lessons for the possible implementation of CDM. The sub-project will work with a limited number of host countries and engage potential investors in jointly identifying, designing and configuring prototype CDM projects through a "Project Development Forum". As potential prototype CDM projects are identified, they will be subjected to investment grade feasibility studies and promoted for investment through pilot CDM investment promotion mechanisms. As prototype, "bankable" projects are taken up by investors, the sub-project will cover the "GHG transaction costs" such as verification, certification and monitoring to offset this important investment barrier.

31. Immediate objectives

31.1. To develop and organize a Project Development Forum in participating countries that can facilitate the identification and delivery of real "learning by doing" commercial projects by the private sector, serving as a practical laboratory for research and learning about the issues related to a viable CDM

31.2. To request for project proposals from countries, which can form a portfolio/pipeline of CDM pilot projects in accordance with the process and methodologies developed through the Project Development Forum.

31.3. To facilitate monitoring, verification, and certification processes which are cost effective and efficient and contribute to the approval of projects in line with national development priorities.

32. Activities and outputs

Activities	Outputs
Project Development Forum	• Learning materials and methodologies • Promote business-to-business & public-private partnerships and relationships in the context of CDM collaboration • Process and analytical tools agreed upon with investor and host participation
Request for pilot CDM proposals	• Establishment of project portfolio and selection of one-two "learning by doing" CDM projects for feasibility studies • Funding coverage for transaction costs related to GHG monitoring, certification and verification
Project feasibility studies	• Investor-ready, investment-grade project portfolio
CDM Investment Workshop	• Develop investment promotion mechanisms and promotion strategy • Promotion of project portfolio for investment
CDM Capacity Building Workshops	• Training of national experts • Strengthening of institutional and technical capabilities
Project take-up and execution	• Investment in selected projects by private sector • Verification, monitoring, certification of projects

Reporting	• Lessons learned • Public dissemination

33. Implementation arrangements

34. The sub-project will be implemented through a strategic partnership between UNDP and the WBCSD in cooperation with UNCTAD and UNIDO. Specific tasks to be implemented by UNCTAD and UNIDO on a sub-contract basis. Outputs from sub-projects 1 and 2 will be deployed as needed in the sub-project. Activities under this project will be coordinated with other relevant projects such as the National AIJ/JI/CDM Strategy Studies Program implemented by the World Bank.

35. Lessons learned in the course of the project will be captured through *sub-project 4: Information Exchange, Communications and Lessons Learned* and communicated to the UNFCCC process and the public at large. Outputs of the sub-project will be shared and disseminated to the other sub-projects.

36. Budget

37. The budget for this project is US$ 1.5 million and has been funded by UNF.

Activity	Costs (US$)
Project Development Forum	200,000
Request for pilot CDM proposals	200,000
Project feasibility studies	350,000
CDM Investment Workshop	200,000
CDM Capacity Building Workshops	200,000
Project take-up and execution	300,000
Reporting	50,000
Total	**1,500,000**

Sub-project 4: Information Exchange, Communications and Lessons Learned
Information exchange and communication of lessons learned to enhance the UNFCCC process and project coordination (led by UNFCCC)

38. The sub-project has three functions. First, it will capture the lessons learned and the strategies developed through a quality assurance process, and ensure that these are fed into the UNFCCC processes and relevant activities such as the CDI, and made readily available for use in future activities. In this sense, the sub-project will protect the initial investment in the pilot project and ensure that future activities on a wider scale can take advantage of the progress that will be achieved.

39. Second, the sub-project will place priority on identifying, creating and maintaining a network of CDM stakeholders (regional experts, expert institutions, potential hosts, donors, and investors, etc.) and developing a communications and outreach strategy, which can facilitate their own preparations for the possible implementation of CDM. The network is meant to reach beyond the immediate project stakeholders and enable interested Parties to follow and be kept informed of the project's activities.

40. Third, the sub-project will contribute to the coordination of the various sub-projects by ensuring the free exchange of information among the sub-projects and by providing integrated information and communication services to the sub-projects and cooperating bodies. In part, the sub-project will alleviate the demands of information and communication within the other sub-projects by providing these services in an integrated manner.

41. The sub-project will use, among others, Internet tools such as "Extranets" and collaborative software to create a one-stop "information house" on CDM and CDM capacity building activities. In order to be more cost-effective, the sub-project will build on the activities and infrastructure of the broader Information and Outreach Programme of the secretariat.

42. Immediate objectives

42.1. To capture the lessons learned and outputs through quality assurance from the project experience and protect the initial investment in the overall project for future use in other activities.

42.2. To feedback and disseminate the lessons learned to the relevant UNFCCC processes and relevant activities such as the CDI and establish a regular system for systematic and coordinated learning and information exchange relative to the future evolution of the CDM.

42.3. To facilitate the coordination of the other sub-projects and other activities through the exchange of information and the provision of integrated information and communication services to the sub-projects.

42.4. To develop a one-stop "information house" for CDM information and outputs.

42.5. To develop a communications strategy with CDM stakeholders with emphasis on developing specific communication packages for distinct CDM stakeholder groups (e.g. business, public sector, business and development NGOs, etc.), in view of enhancing partnerships.

42.6. To network CDM stakeholders
coordinators, regional experts,
investors and hosts, etc.) and f
the CDM-related UNFCCC proc

43. Activities and outputs

Activities and costs	
Information exchange and project coordination (US$ 100,000)	• "Project Ex facilities fo documents database, e • Mechanism coordinatio
Capturing Lessons Learned through Quality Assurance (US$ 200,000)	• Quality ass learned (inc dialogue, et • Project Ste videoconfer • Strategic pa
Networking of CDM stakeholders (US$ 100,000)	• Network of • Internet-bas database • Facilitating
One-stop Information House (US$ 100,000)	• Collaborativ CDM featur including ou • Publication lessons lear • Information
Development of communications strategy on CDM (US$ 100,000)	• Prototype co and regional • Communicat • Information national and
CDI Global Conference (US$ 10,000)	• Presentation strategy and • Consultation
Special events at subsidiary body COP meetings (US$ 10,000 x 3 meetings)	• Presentation • Consultation • Exchange of
CC:Forum meetings on CDM (US$ 10,000 x 3 meetings)	• Consultations • Exchange of

44. Implementation arrangements

45. The sub-project will act as the secretariat to the pilot project's Project Steering Group (PSG) and will provide information and communication services to the various sub-projects through its communication and outreach activities. The secretariat will link the sub-project activities closely to its own ongoing communications and outreach work to reduce infrastructure and maintenance costs

46. Various communication media will be used in the implementation of this sub-project, with emphasis on cost-effective, broadly accessible communication tools such as the Extranets, web sites, CD-ROMs, and specific stakeholder channels (information services of various sector groups, existing NGO publications, etc.). Shared, collaborative databases and document management systems will be used to promote information exchange among the sub-projects and other relevant activities.

47. Budget

Activity	Costs (US$)
Information exchange and project coordination	100,000
Capturing lessons learned through quality assurance	200,000
Networking of CDM stakeholders	100,000
One-stop Information House	100,000
Development of communications strategy for CDM	100,000
GEF CDI Global Conference	10,000
Special events at subsidiary body and COP meetings (3 meetings x $10,000)	30,000
CC:Forum meetings on CDM (3 meetings x $10,000)	30,000
Total	**670,000**

Overall implementation strategy

48. Institutional and oversight arrangements

49. The pilot project will be directed by a Project Steering Group (PSG) composed of senior operational representatives from the participating UN bodies, cooperating international agencies, and sector representatives as shown below:

    49.1. UNFCCC secretariat (Chair)
    49.2. UNCTAD
    49.3. UNDP
    49.4. UNEP
    49.5. UNIDO
    49.6. GEF
    49.7. World Bank
    49.8. Business Sector: WBCSD
    49.9. Environment-Development Sector:

50. The PSG will serve for the duration of the project. The PSG will be comprised of one representative from each of the participating UN bodies. The PSG will meet four times during the life of the project (twice a year for 2 years) and at such other times as necessary. Maximum use will be made of telephone and video conferencing, as well as other Internet-based communications.

51. The project intranet developed in sub-project 4 will be used to keep the PSG informed of the activities, issues, progress and developments of the project.

52. Because of the special coordination between the pilot project and the CDI, the CDI Manager will be invited to attend the PSG, as needed.

53. The PSG will have the following roles and tasks:

    53.1. Development of country selection criteria
    53.2. Overall project management, coordination and monitoring
    53.3. Oversight of preparation and peer review of project outputs and other publications
    53.4. Coordination on selection of activity venues
    53.5. Coordination of project activities to maximize impact (particularly in terms of date and place, agenda, participation)
    53.6. Review of project implementation reports by each agency
    53.7. Communication of reports to intergovernmental bodies, donors and other stakeholders

54. The UNFCCC secretariat will appoint a Project Manager to manage the day-to-day operation of the secretariat-led sub-projects and to manage the coordination of the overall pilot project. The Project Manager will be an ex-officio member of the various project management teams that each of the sub-projects might establish. In addition, he/she will have the following tasks:

    54.1. Act as secretary of the Steering Committee
    54.2. Ensure that sub-project 4 provides adequate conferencing, information and communication services to the Project Steering Group
    54.3. Coordinate and work with the respective sub-project managers from the participating agencies to achieve the overall objectives of the project
    54.4. Undertake additional fund-raising, as needed

54.5. Draft the overall pilot project reports for Parties
54.6. Ensure that the project complies and responds to relevant COP decisions and guidance, including suggesting revisions on the overall direction of the project to the PSG
54.7. Monitor performance of the project and report (twice a year) to the PSG
54.8. Draft final reports to the donors upon termination of the project, based on inputs received from Steering Committee members
54.9. Develop further joint projects in cooperation with the relevant agencies

55. Operational arrangements

56. In order to ensure that the project will model the decisions that the COP might take on CDM and capacity building, the project will be guided by the following operational principles:

56.1. Put priority on national implementation by national institutions and strengthen national and regional institutional arrangements conducive to the implementation of the UNFCCC, and eventually the CDM
56.2. Activities implemented at the country level will make full use of UNDP Country Offices
56.3. Build an iterative and learning process for the assessment of needs and the delivery of capacity building services
56.4. Facilitate the participation of public and private sector entities
56.5. Encourage and enable capacity building support services to be provided by developing country-based expert institutions at sub-regional and regional levels
56.6. Mobilize national stakeholders to the opportunities and challenges presented by CDM, including options for its future development, and encourage the emergence and strengthening of appropriate national agendas and institutional arrangements
56.7. Enhance the participation of developing countries in the UNFCCC negotiations
56.8. Focus on preparing Parties to operationalize all of the basic elements of CDM

57. In order to ensure that the project will be coordinated and achieve its overall objectives, certain information on operational details will be shared between the sub-projects. The following information will be considered –

57.1. National focal points and national contacts
57.2. Activity schedules
57.3. Project terms of reference and agreements between projects and national focal points
57.4. Regional experts and expert institutions
57.5. Project outputs
57.6. Problems and obstacles encountered

58. The information above will be shared among the sub-projects on a secured basis through the Project Intranet. Issues flowing from this information can then be subject to discussion and resolution among the sub-project managers and sub-project management teams.

59. In addition, the sub-projects will consider coordinating other project components such as the use of a common training methodology and approach, joint publications, etc.

60. The items for coordination will be kept to a minimum to ensure that the sub-projects are led and implemented as independently as possible. Reporting requirements will also be kept to the absolute minimum in order to free resources to achieve maximum impact.

Relationship between workshops and activities

No.	Workshops and activities	Linkages with sub-projects				Comments
		1	2	3	4	
Sub-project 1: Preparing for CDM						
1.a	3 Regional awareness-raising, agenda setting workshops		X	O		Integrated with 2.b, and coordinated with 3.a
1.b	9 National awareness-raising, agenda setting workshops		O			Coordinated with 2.c
1.c	9 National studies on CDM		X			Integrated with 2.c
1.d	3 Regional follow-up workshops		X		O	Integrated with 2.d and coordinated with 4.f
1.e	18 National consultative meetings		O			Coordinated with 2.e
Sub-project 2: Developing CDM Tools						
2.a	2 Expert meetings	O				Coordinated (back-to-back) with 1.a
2.b	3 Regional consultative meetings	X				Integrated with 1.a
2.c	9 National testing of tools	X				Integrated with 1.c
2.d	Training of practitioners	X				Integrated with 1.c and 1.d
2.e	Deployment of CDM tools	O				Coordinated with 1.e
Sub-project 3: Testing CDM Projects						
3.a	Project Development Forum	O	O			Coordinated with 1.a and 2.a
3.b	CDM Investment Promotion workshop					
3.c	CDM Capacity Building workshops		X			Integrated with 2.b and 2.d
Sub-project 4: Information exchange, Communications and Lessons Learned						
4.a	Information exchange					
4.b	Capturing lessons learned	X				Integrated with 1.d
4.c	Networking of CDM stakeholders	O	O	O		Coordinated with all sub-projects
4.d	Information House	O	O	O		Coordinated with all sub-projects
4.e	CDM Communications Strategy	O	O	O		Coordinated with all sub-projects
4.f	CDI Regional Consultations and Global Conference	O				Coordinated with 1.d
4.g	Special events at COP	O	O	O		Coordinated with all sub-projects

61. Note:

- *Integrated* activities/events (marked with X) implies that the activities are the same but integrating various objectives
- *Coordinated* activities/events (marked with O) implies that the activities are held back-to-back or closely related with outputs shared between the sub-projects

62. In total, there will be a maximum of 4-5 regional events excluding planned activities of the CDI, and 9 national events with significant international participation.

Time table

63. To be completed after consultation and final revision of project proposal.

Global Indicative Budget

Sub-projects	Costs (US$)
Sub-project 1: Preparing for CDM: Awareness-raising, agenda-setting, institution-building (to be determined)	1,085,000
Sub-project 2: Developing CDM Tools	1,450,000
Sub-project 3: Prototype CDM projects (UNDP)	1,500,000
Sub-project 4: Information Exchange, Communications and Lessons Learned (UNFCCC)	670,000
Sub-total	**4,705,000**
Project support costs (5%)	235,000
Total Project Budget	**4,930,000**
Funded sub-projects	**1,500,000**
Total funding requirements	**3,430,000**

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METHODOLOGICAL ISSUES

EMISSIONS RESULTING FROM FUEL USED FOR INTERNATIONAL TRANSPORTATION

Ways to further strengthen the exchange of information between the International Civil Aviation Organization, the International Maritime Organization and UNFCCC

Note by the secretariat

I. MANDATE

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA), at its tenth session, invited the secretariat to explore ways to further strengthen the exchange of information between the International Civil Aviation Organization (ICAO), the International Maritime Organization (IMO) and the SBSTA. It requested the secretariat to report to it on these issues at its eleventh session (FCCC/SBSTA/1999/6, para. 46 (e)).

II. BACKGROUND AND POSSIBLE ACTION BY THE SBSTA

2. To respond to the above mandate, preliminary discussions were held on several occasions between the secretariats of ICAO, IMO and UNFCCC. Various ways to strengthen the exchange of information were discussed as described below.

3. The SBSTA may wish to consider the information provided in this paper and determine whether the suggested approaches are appropriate and/or whether additional steps should be taken to further strengthen the exchange of information between the three secretariats.

III. APPROACHES TO EXCHANGE OF INFORMATION

A. Regular progress reports

4. At the invitation of the SBSTA, the ICAO and IMO secretariats agreed to provide regular progress reports on their activities relating to emissions based on fuel sold to ships or aircraft engaged in international transport to the SBSTA. These progress reports may include information on the activities of ICAO, its Committee on Aviation Environmental Protection (CAEP) and its working groups, and on the work of IMO, in particular its Marine Environment Protection Committee (MEPC). Both organizations agreed to provide their schedules of meetings and agendas.

B. Participation of UNFCCC officials in meetings of ICAO and IMO

5. Representatives of ICAO and IMO are routinely invited to the SBSTA meetings. Discussions with both organizations have focused on how representatives of the UNFCCC process, that is the Chairman of the SBSTA, one of the other officers or the secretariat, might be invited to relevant meetings of ICAO and IMO.

6. A representative of the UNFCCC will be invited to participate in the 44th meeting of the Marine Environment Protection Committee, to be held from 6 to13 March 1999. Air pollution is a permanent item on the agenda of this committee. Official UNFCCC documents prepared for SBSTA sessions could be submitted to the Committee for information purposes.

7. In the case of ICAO, relevant meetings could include the Assembly (the next meeting being in late 2001), the Committee on Aviation Environmental Protection (which usually meets every three or four years), its steering group (which usually meets once a year) and its working groups (each of which usually meets two or three times per year), notably the working group on market-based options (WG5), which is considering emissions charges, fuel taxes, emissions trading and voluntary agreements. The UNFCCC secretariat requested observer status for these meetings, but has not yet received a reply.

C. Joint working group

8. During SBSTA 10, several delegates mentioned the possibility of establishing a joint working group between ICAO and/or IMO and the SBSTA similar to the model of the joint working group between IPCC and the SBSTA,[1] to meet on the margins of ICAO, IMO or UNFCCC meetings.

9. There was general agreement that this option should be kept under consideration, but that the level of activities between ICAO, IMO and UNFCCC is less than that between IPCC and

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[1] The joint working group of IPCC and SBSTA officers meets two to three times a year, typically on the margins of a UNFCCC or IPCC meeting. These meetings are usually devoted to exchange of information on the status of reports and plans for upcoming meetings of both organizations.

UNFCCC. It was felt that the idea of a formal joint working group should be delayed until substantive progress is made. However, consultations between the Chairman of the SBSTA or one of the other officers could be held with relevant officials of ICAO or IMO during meetings identified above.

D. Workshop or side event at UNFCCC meetings

10. Another possible way to strengthen the exchange of information may be a joint workshop between the SBSTA, ICAO and/or IMO on international bunker fuels or a side event at a UNFCCC meeting. A workshop or side event could help to further inform delegates to the UNFCCC about the progress reports on ICAO and/or IMO activities or provide an opportunity to influence the design of projects and programmes in these organizations.

11. In the discussions between the ICAO, IMO and UNFCCC secretariats, it was felt that a workshop could be useful when significant progress has been made by ICAO and IMO on this issue, most likely late in 2001. A side event focusing on plans and progress could be arranged during a future session of the SBSTA.

IV. EMISSION DATA

12. During the discussions between the ICAO, IMO and UNFCCC secretariats, the issue of available data on international bunker fuels was discussed.

A. ICAO

13. ICAO does not collect or estimate greenhouse gas emissions from global civil aviation. It operates a statistics programme that collects comprehensive data from States on a systematic basis. In accordance with the mandate of ICAO, the statistics programme covers civil aviation, but not military aviation. Its main focus is on commercial air transport operations, with less emphasis placed on other forms of civil aviation. For each State, ICAO collects a wide range of data, including a number of indicators relating to commercial air transport activity, such as tonne-kilometres available (measure of capacity offered) and tonne-kilometres performed (measure of traffic carried). In addition, flight schedules of all airlines are available. It is conceivable that some of these measures of aviation activity could be used as a component in estimating emissions.

14. For the purpose of a study entitled "Regional Differences in Fares, Rates and Costs for International Air Transport" by ICAO, flight schedules and estimates of fuel consumption by aircraft type for different stage lengths are used to calculate the fuel consumed. Resulting fuel consumption only covers scheduled operations, therefore underestimating fuel use in regions such as Europe, where non-scheduled operations are significant.

15. In addition, within the Committee on Aviation Environmental Protection, the results of two studies were compared, which estimated aviation emissions and their geographical distribution in longitude, latitude and altitude. No attempt had been made to distinguish between

countries or between national and international emissions. Most of the work has been undertaken in the United States of America and in Europe. These studies are summarized in chapter 9 of the *IPCC Special Report on Aviation and the Global Atmosphere*.

B. IMO

16. IMO does not undertake any systematic collection or monitoring of the fuel consumed greenhouse gases emitted by the world fleet.

17. IMO has a work programme to monitor the sulphur content of marine bunker fuels worldwide in accordance with regulation 14 (2) of MARPOL Annex VI and the guidelines for such monitoring have been adopted. Worldwide sulphur monitoring has been initiated and it is expected that the Marine Environment Protection Committee will receive the outcome of the monitoring in future sessions.

18. MARPOL Annex VI, once it enters into force, will require ships to keep onboard the bunker delivery note which should include information on the quantity and quality of fuels delivered. The bunker delivery note will be required to be kept for three years for inspection by port and flag States, but there is no mechanism established to collect such information centrally. The bunker delivery notes may provide useful information on consumption of marine bunker fuels worldwide but the above-mentioned Committee has not discussed this issue.

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